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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/707,009	11/06/2000	Lin R. Higley	OBC-101	5944

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ENERGY CONVERSION DEVICES, INC.
2956 WATERVIEW DRIVE
ROCHESTER HILLS, MI 48309

EXAMINER

ALEJANDRO, RAYMOND

ART UNIT	PAPER NUMBER
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1745

7

DATE MAILED: 09/25/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/707,009

Applicant(s)

HIGLEY ET AL.

Examiner

Raymond Alejandro

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 August 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-69 is/are pending in the application.
- 4a) Of the above claim(s) 6,21 and 36-53 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5,7-11,13-20,22-24,26-35,54,55 and 57-69 is/are rejected.
- 7) ☒ Claim(s) 12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 November 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Group I (claims 1-5, 7-20 and 22-35) in Paper No. 6 is acknowledged. The traversal is on the ground(s) that "the restriction requirement is submitted to be improper. Group I is drawn to a multi-cell battery. Group II is drawn to a bipolar electrochemical battery. A bipolar battery is a specie of a multi-cell battery". Applicant is thanked for this significant clarification as to how the multi-cell battery and the bipolar battery are related to each other. However, in view of applicant's admission that a bipolar battery is a species thereof, the restriction requirement is now applied (it now becomes an election of species for the reason of record) as an election of species between a construction or packaging of individual cells and bipolar cells. Accordingly, a first species is the arrangement of single electrochemical cell (the embodiment shown in Figure 9); and a second species is the bipolar configuration (the embodiment shown in Figure 1). Thus, (premised on applicant's clarification of the restriction) the requirement is still deemed proper and is therefore made FINAL. (*An action on merits has been hereby issued, because the applicants have provisionally elected with traverse Group I or Species I*).

2. It is also noted that claims 54-69 were inadvertently grouped in Group II. However, the foregoing claims depend from claim 1 which is one of the independent claims of Group I. Accordingly, claims 54-69 are now re-joined to be part of Group I and fully examined for patentability purposes.

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Drawings

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "37" has been used to designate both the cell connector and the connection spacer. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "24" and "25" has been used to designate both the battery terminals and the negative and positive electrode, respectively (see page 36). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 22-35, 54-57 and 67 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. Claim 22 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: it is unclear as to what particular structural orientation or

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configuration is intended when "the hydrophobic material is positioned relative to the opening".

It is uncertain what specific placement is intended to instantly claim.

8. Claims 54-55 and 57 recite the limitation "said hydrophobic material" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim.

9. Claims 56 and 67 recites the limitation "said opening" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 1-5, 7-11, 13-20, 22-24, 26-35, 54-55 and 57-69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Klein 5478363 in view of Sindorf 5059496.

The instant claims are directed to a multi-cell battery wherein the disclosed inventive concept comprises the particular gas port passage therein.

With respect to claims 1, 7 and 22-24, 27, 54-55, 57, 67-69:

Klein discloses a multi-cell battery made by stacking several wafer cells (col 5, lines 61-62). It is disclosed that the electrodes, the separator between the electrodes and the electrolyte are contained within an enclosed wafer cell (col 5, lines 1-5). The enclosed wafer cell may be completely sealed or it may be provided with vents for release of excess pressured gas (col 5, lines 15-20). It is further taught that alternatively, the stack may be contained in an outer battery

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housing that serves as the battery housing (col 6, lines 15-20). If the cell stack is contained in an enclosed outer housing, the outer housing can serve to provide stack compression and the housing maybe sealed or vented (col 6, lines 24-27). Figure 3 shows an embodiment in which the multiple cells each have a small vent port and the cells are contained in a sealed container which serves as the battery housing (col 6, lines 27-30). It is also disclosed that a non-conductive material maybe sealed peripherally to the outer layers to form a border material around the entire perimeter of the electrodes such as to form a sealed enclosure containing the pair of electrodes, the separator and the electrolyte within the wafer cell (col 5, lines 7-10).

As for claims 2-3, 8-10, 19-20, 26, 34-35:

It is disclosed that the border material is preferably of a polymeric material that may be heat sealed to the outer layers wherein the polymeric material is preferably a vinyl polymer (col 5, lines 10-14) It is also taught that the outer layers are sealed peripherally to an electrically non-conductive polymeric material such as to form a sealed enclosure containing the electrodes, the separator and the electrolyte (col 3, lines 21-30)

With respect to claim 4, 16, 31, 60:

It is taught that the electrolyte is alkaline (col 5, lines 46-49).

Regarding claim 5, 14-15, 29-30, 58-59:

It is disclosed that the battery is a nickel-metal hydride (col 3, lines 1-3/ col 3, lines 15-20). It is also disclosed that the negative electrode is a bonded metal hydride alloy powder that can store hydrogen (col 4, lines 46-50); and the positive electrode is made of nickel hydroxide (col 4, lines 55-60).

As to claim 13, 28, 66:

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It is disclosed that the cells are electrically arranged in series with the positive face of each cell contacting the negative face of the adjacent cell (col 5, lines 61-65).

With reference to claim 63:

It is disclosed a first electrically conductive outer layer in electrical contact with the outer face of the metal hydride electrode; and a second electrically conductive outer layer in electrical contact with the outer face of the nickel electrode; wherein the outer layers are sealed peripherally to an electrically non-conductive polymeric material such as to form a sealed enclosure containing the electrodes, the separator and the electrolyte (col 3, lines 21-30).

As to claim 64-65:

It is disclosed that the outer layers are made of a conductive, carbon-filled material (col 4, lines 33-35) wherein it may contain a conductive paste or cement (col 4, lines 42-45).

As to claims 18, 33, 62:

It is disclosed that the cell showed no indication of pressure above 20 psi during the cycle operation (col 11, lines 13-15). Thus, the battery operates at a pressure of at least 10 psi.

As far as claims 17, 32, 61:

It is disclosed that the compact stack assembly is held in compression to insure uniform physical contact between the adjacent cells and between the respective layers within each cell (col 6, lines 4-8); and if the cell stack is contained in an enclosed outer housing, the outer housing can serve to provide stack compression and the housing may be sealed or vented (col 6, lines 24-26/ col 6, lines 37-39); or the stack may contained internal rods to insure uniform compression and contact of the cells (col 6, lines 37-39).

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Klein discloses a multi-cell electrochemical battery according to the foregoing. However, Klein does not expressly teach the cell enclosure preventing passage of the electrolyte out of the cell wherein the material is either gas permeable or hydrophobic.

Sindorf discloses a plurality of nickel-hydrogen cell modules suitably contained in a housing (col 11, lines 65-68) so as to provide for rapid gas diffusion, each cell has a port, provided in the housing to allow gas access to the interior of the hydrophobic housing port wherein the port comprises a filter suitably made of a non-wetting porous material or a plate made of sintered polymeric material which allows gases, in particular hydrogen gas, to pass freely through the filter but will not allow liquid electrolyte to pass through and escape from the cell (col 12, lines 25-40/ claims 1, 11-12); the filter is of sufficient are to permit the flow of hydrogen in and out through the port; the non-wetting character of the filter and the housing tends to reject the liquid electrolyte from their surfaces in favor of the components such as electrodes, separators, and absorbers which are typically hydrophilic (col 12, lines 25-40/claims 1, 11-12). Figure 5 shows the gas port and the hydrophobic material therein protruding out of the enclosure.

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to make Klein's enclosure preventing escape of electrolyte out of the cell and made from a material which permeate gas or hydrophobic as Sindorf teaches a cell housing for cell modules and electrolyte that maintains the proper electrolyte concentration in the cell and prevent electrolyte bridging and a gas port in each cell housing to allow flow of gas into and out of the housing without the exit of electrolyte. Accordingly, this maintains the proper electrolyte concentration in the cell and prevent electrolyte bridging; and the non-wetting character of the

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filter and the housing tends to reject the liquid electrolyte from their surfaces in favor of the components such as electrodes, separators, and absorbers which are typically hydrophilic. Thus, this electrolyte management feature allows the battery or cell supplied with sufficient electrolyte, to deliver maximum energy both early in service life and after thousands of cycles.

Additionally, it is also noted that Klein inherently discloses that the electrolyte does not come out of the cell as Klein teaches that a non-conductive material may be sealed peripherally to the outer layers to form a border material around the entire perimeter of the electrodes such as to form a sealed enclosure containing the pair of electrodes, the separator and the electrolyte within the cell. Thus, those of ordinary skill in the art will obviously understand that a sealed enclosure does not allow electrolyte to pass out of the enclosure.

With respect to the material being either gas permeable or hydrophobic, it is also noted that Klein inherently discloses a material having gas permeability and hydrophobic properties as Klein teaches that the border material is preferably of a polymeric material wherein the polymeric material is preferably a vinyl polymer. Thus, those of ordinary skill in the art will also recognize that Klein's specific polymeric material, at least to some extent, shows a gas permeability and hydrophobic behavior. It is also noted that Klein's material is a polymeric one as the specific material of the instant claims. Thus, since no specific degree of gas permeability has been set forth so as to particularly define the quality or state of being capable of being permeated or penetrated, the claims obvious over the prior art of record. As well as, it is understood that a polymer of a vinyl compound or a product made from such a polymer lacks affinity for water as instantly recited.

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Allowable Subject Matter

12. The following is a statement of reasons for the indication of allowable subject matter: a through search for the prior art failed to reveal what is instantly claimed, in particular: a) the membrane protruding outwardly from the cell or comprising at least one corrugated layer of a membrane material; and b) the opening being a circuitous pathway formed by said hydrophobic material.

13. Claim 12 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

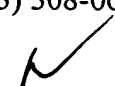
14. Claims 25 and 56 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (703) 306-3326. The examiner can normally be reached on Monday-Thursday (8:30 am - 7:00 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (703) 308-2383. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.


Patrick Ryan
Supervisory Patent Examiner
Technology Center